

What is claimed is:

1. A tone characteristic setting device for setting tone characteristic to be used for converting original tone data into input tone data to be supplied to an image formation device, the tone characteristic setting device comprising:

a memory storing data of tone characteristic of an image formation device;

a test chart production control unit that controls the image formation device to produce a test chart;

a condition preparing unit preparing a condition for setting tone characteristic based on either one of the tone characteristic data stored in the memory and actual tone characteristic indicated by the test chart produced by the image formation device; and

a characteristic setting unit setting tone characteristic based on the condition prepared by the condition preparing unit.

2. A tone characteristic setting device as claimed in claim 1, wherein the condition preparing unit includes:

a tone characteristic producing unit that produces main tone characteristic data by executing a tone characteristic production operation to input data of a plurality of input levels to the image formation device to control the image formation device to produce a plurality of

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tone patches, to control a tone measurement device to measure tones of the plurality of tone patches and to produce data of a plurality of output levels indicative of the measured tones of the tone patches, and to produce the main tone characteristic data based on relationship between the output levels and the corresponding input levels; and

a storing unit that stores the main tone characteristic data in the memory while allowing the memory maintaining auxiliary tone characteristic data, and

wherein the setting unit includes a retrieving unit that retrieves either one of the main tone characteristic data and the auxiliary tone characteristic data to set the retrieved tone characteristic data as indicative of the characteristic of the image formation device.

3. A tone characteristic setting device as claimed in claim 2, wherein the storing unit stores, in the memory, a set of main tone characteristic data that is produced in the present tone characteristic production operation, while allowing the memory to maintain, as the auxiliary tone characteristic data, another set of main tone characteristic data that has been produced by the tone characteristic producing unit during another tone characteristic production operation that is executed prior to the present tone characteristic production operation.

4. A tone characteristic setting device as claimed in

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claim 2, wherein the storing unit stores, in the memory, a set of main tone characteristic data that is produced in the present tone characteristic production operation, while allowing the memory to maintain, as the auxiliary tone characteristic data, another set of main tone characteristic data that has been produced by the tone characteristic producing unit during another tone characteristic production operation that is executed before the tone characteristic setting device is shipped from a manufacturer.

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10 5. A tone characteristic setting device as claimed in claim 2, wherein the storing unit stores, in the memory, a set of main tone characteristic data that is produced in the present tone characteristic production operation when the image formation device is set in a present image forming condition, while allowing the memory to maintain, as the auxiliary tone characteristic data, another set of main tone characteristic data that has been produced by the tone characteristic producing unit during another tone characteristic production operation that is executed when the image formation device is set in another image forming condition different from the present image forming condition in at least one of a model of the image formation device, a kind of image formation material, a type of a medium, an image resolution, and an image formation speed employed in
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25 the image formation device.

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6. A tone characteristic setting device as claimed in claim 5, wherein the storing unit allows the memory to maintain, as a plurality of sets of auxiliary tone characteristic data, a plurality of sets of main tone characteristic data that have been produced for a plurality of image forming conditions, and

wherein the retrieving unit retrieves either one set from the plurality of sets of auxiliary tone characteristic data according to a priority that is previously determined based on a combination of matching conditions.

7. A tone characteristic setting device as claimed in claim 2, wherein the storing unit stores, in the memory, a set of main tone characteristic data that is produced in the present tone characteristic production operation for a present image formation device, while allowing the memory to maintain, as the auxiliary tone characteristic data, another set of main tone characteristic data that has been produced by the tone characteristic producing unit during another tone characteristic production operation that is executed for another image formation device of the same model type of the present image formation device.

8. A tone characteristic setting device as claimed in claim 1, wherein the condition preparing unit prepares a plurality of sets of standard output value data and a plurality of sets of standard tone characteristic data, each

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standard output value data set corresponding to one of the plural sets of standard tone characteristic data,

wherein the characteristic setting unit includes:

an input unit that inputs data of a plurality of test input values to the image formation device, thereby controlling the image formation device to produce a plurality of tone patches;

a measurement control unit that controls a tone measurement device to measure tones of the plurality of tone patches, thereby producing a plurality of output values indicative of the measured tones of the tone patches;

a comparing unit that compares data of the plurality of output values with each set of standard output value data;

a selecting unit that selects one set of standard output value data based on the comparing results and selects one standard tone characteristic data set that corresponds to the selected standard output value data set; and

a setting unit that sets the selected standard tone characteristic data as tone characteristic data for the image formation device.

9. A tone characteristic setting device as claimed in claim 8, wherein the selecting unit selects one set of standard output value data that has a smallest color

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difference from the plurality of output values.

10. A tone characteristic setting device as claimed in claim 8, wherein the selecting unit selects one set of standard output value data that has a smallest density difference from the plurality of output values.

11. A tone characteristic setting device as claimed in claim 8, wherein each set of standard output value data includes a single value, the comparing unit calculating an average value for the output values measured from all the tone patches, and comparing the average value with the single value of each standard output level data set.

12. A tone characteristic setting device as claimed in claim 8, wherein each set of standard output value data includes at least one value, the comparing unit selecting at least one output value of at least one intermediate tone from the plurality of output values measured from all the tone patches, and comparing the selected at least one output value with the at least one value in each standard output value data set.

13. A tone characteristic setting device as claimed in claim 12, wherein the at least one value corresponds to at least one intermediate tone.

14. A tone characteristic setting device as claimed in claim 1, further comprising a conversion unit that converts an original tone data into input tone data to be

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supplied to the image formation device according to the set tone characteristic data.

15. A tone characteristic setting device as claimed in claim 1, wherein the condition preparing unit³⁰ controls the test chart producing unit¹⁰ to control the image formation device¹² to produce a test chart¹⁶, thereby enabling a user to visually confirm the test chart, and¹⁰

wherein the characteristic setting unit includes:

an input unit for enabling the user to input his/her observation result; and

characteristic setting operation executing unit executing, in response to the input of the observation result, an operation to set tone characteristic indicative of the present characteristic of the image formation device.

16. A tone characteristic setting device as claimed in claim 15, wherein the test chart producing unit controls the image formation device to produce the test chart that has several regions within a single image formation area, the test chart producing unit controlling the image formation device to produce images in the several regions by changing at least one of coloring material and composition of coloring material.

17. A tone characteristic setting device as claimed in claim 15, wherein the condition preparing unit includes an instruction input unit enabling the user to input an

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instruction to produce the test chart, the condition preparing unit, upon receipt of the instruction, controlling the test chart producing unit to control the image formation device to produce the test chart.

5 18. A tone characteristic setting device as claimed in claim 17, wherein the condition preparing unit includes another memory storing test data for producing the test chart.

10 19. A tone characteristic setting device as claimed in claim 18, wherein the test chart producing unit controls the image formation device to produce the test chart, thereby enabling the user to visually judge similarity in color between each image region in the test chart.

15 20. A tone characteristic setting device as claimed in claim 16, wherein the test chart producing unit controls the image formation device to produce the several regions to indicate some character pattern, thereby enabling the user to visually judge the character pattern on the test chart.

20 21. A tone characteristic setting device as claimed in claim 16, wherein the test chart producing unit controls the image formation device to produce the several regions to indicate some figure pattern, thereby enabling the user to visually judge the figure pattern on the test chart.

25 22. A tone characteristic setting device as claimed in claim 16, wherein the test chart producing unit inputs, to the image formation device, test data that presents, for the

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several regions, the same intermediate tones by changing at least one of coloring material and composition of coloring material.

23. A tone characteristic setting device as claimed
 5 in claim 17, wherein the condition preparing unit controls the test chart producing unit to control the image formation device to produce the test chart when the tone characteristic setting unit is powered ON.

24. A data recording medium storing a tone
 10 characteristic setting program for being read by a computer system to control the computer system to set tone characteristic data of an image formation device, the computer storing data of tone characteristic of the image formation device, the program comprising:

15 a program controlling the image formation device to produce a test chart;

a program preparing a condition for setting tone characteristic based on either one of the tone characteristic data stored in the memory and actual tone characteristic
 20 indicated by the test chart produced by the image formation device; and

a program setting tone characteristic based on the prepared condition.

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